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Fault Monitoring in PEFC Stacks by Evaluation of Local Performance and Cell Impedance Analysis

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Outline

- Fault detection setup
- Performance vs. load
- Membrane dry-out
  - Anodic faults
  - Cathodic faults
- Lessons learned

Lessons learned

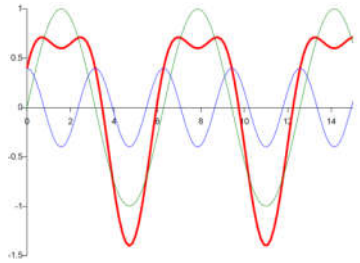
- Monitoring of high importance

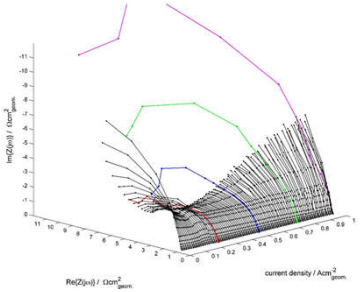
  → Assure high efficiency and lifetime

- CVM is not sufficient to identify fault modes

- PCB and impedance technique improve monitoring sensitivity and understanding of local faults
  - Cell location in stack
  - Active area

- **On-line** monitoring of **single cells** seems to be achievable using DEIS





- Implementation of DEIS for reliable fault monitoring and detection in PEMFC single cells and stacks; K. Darowicki, E. Janicka, M. Mielniczek, A. Zielinski, L. Gawel, J. Mitzel, J. Hunger; Electrochimica Acta 292 (2018) 383-389
- The influence of dynamic load changes on temporary impedance in hydrogen fuel cells, selection and validation of the electrical equivalent circuit; K. Darowicki, E. Janicka, M. Mielniczek, A. Zielinski, L. Gawel, J. Mitzel, J. Hunger; Applied Energy, 251, 13396, doi: 10.1016/j.apenergy.2019.113396

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